
Suisun Marsh Monitoring Program Channel Water Salinity Report

Reporting Period: December 2002

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Questions regarding this report should be directed to:

Ken Minn
California Department of Water Resources
Division of Environmental Services
3251 S Street
Sacramento, CA 95816-7017

Telephone: (916) 227-7520
kminn@water.ca.gov

SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT

The California Department of Water Resources (DWR) is required to provide monthly channel water salinity compliance reports for the Suisun Marsh to the SWRCB. This requirement is based on SWRCB Water Rights Decision 1641, dated December 29, 1999, and previous SWRCB decisions. Channel water salinity conditions in the Suisun Marsh are determined by monitoring specific electrical conductivity. Specific electrical conductivity is referred to in the reports as "specific conductance".

The locations of all listed stations are shown in Figure 5.

The monthly reports are submitted for October through May each year in accordance with SWRCB requirements. The reports are required to include salinity data from the stations listed below:

Station Identification	Station Name	General Location	Status
C-2*	Collinsville	Western Delta	Compliance Station
S-64	National Steel	Eastern Suisun Marsh	Compliance Station
S-49	Beldon's Landing	North-Central Suisun Marsh	Compliance Station
S-42	Volanti	North-Western Suisun Marsh	Compliance Station
S-21	Sunrise	North-Western Suisun Marsh	Compliance Station

*Throughout this report, the representative data from nearby USBR station is used in lieu of data from station C-2.

Data from the stations listed below are included in the monthly reports to provide information on salinity conditions in the western Suisun Marsh.

Station Identification	Station Name	General Location	Status
S-97	Ibis	Western Suisun Marsh	Monitoring Station
S-35	Morrow Island	South-Western Suisun Marsh	Monitoring Station

Information on Delta outflow, area rainfall, and operation of the Suisun Marsh Salinity Control Gates are included in the monthly reports to provide information on conditions that may affect channel water salinity in the Marsh.

Monitoring Results

Channel Water Salinity Compliance

State Water Resources Control Board channel water salinity standards for the Suisun Marsh were met at all five compliance stations during December 2002 (Table 1). Compliance with channel water salinity standards was determined for each compliance station by comparing December mean high-tide specific conductance (SC) with respective standards. The standard for all the compliance stations (i.e. C-2, S-64, S-49, S-42, S-21) was **15.5mS/cm** during December 2002. Table 1 lists monthly mean high-tide SC at the compliance stations.

The progressive daily mean SC for each station is used to track salinity conditions during each month (Figures 1). The progressive mean is calculated for each compliance station. The progressive daily mean (PDM) is the mean of daily average high-tide SC of the month. The mathematical equation is shown below. New progressive mean calculations begin at the start of each calendar month.

$$\text{PDM} = \frac{\sum \text{daily average of high tide SC}}{\text{\# days of the month}}$$

Delta Outflow

Low Delta outflow occurred in the first half of December 2002 (Figure 3), however, the second half was the opposite. Due to increased precipitation which resulted in high runoffs, Delta Outflow peaked at about 60,000cfs in December. The monthly mean Net Delta Outflow Index (NDOI) for December is listed below:

Month	Mean NDOI (cubic feet per second)
December	25,430

The NDOI is the estimated average daily rate of outflow from the Delta.

Rainfall

Total monthly rainfall at the Waterman Gauging Station in Fairfield during December 2002 is listed below:

Month	Total Rainfall (inches)
December	13.86

Suisun Marsh Salinity Control Gate (SMSCG) Operations

Operations and flashboard/boat lock installations at the SMSCG during December 2002 is summarized below.

Date	Gate status	Flashboards status	Boat Lock status
December 1 – 30	Operating	Installed	Closed
December 31	3 gates open	Installed	Closed

The SMSCG operated normally throughout December 2002, except on December 31, where all three gates were held open due to low water quality levels in the marsh. The flashboards remained installed in the event that gate operation is needed to control salinity in the coming control months.

Discussion

Factors Affecting Channel Water Salinity in the Suisun Marsh

Factors that affect channel water salinity levels in the Suisun Marsh include:

- delta outflow;
- tidal exchange;
- rainfall and local creek inflow;
- managed wetland operations; and,
- operation of the SMSCG and flashboard configurations.

Observations and Trends

Conditions during the Reporting Period

Salinity levels at all compliance stations ranged between 9mS/cm and 13mS/cm at the start of December (Figure 1). In contrast, the two monitoring stations recorded salinity level around 15.0mS/cm (Figure 2). Around mid-December, salinity level at all compliance and monitoring stations dropped considerably due to increase precipitation and runoffs. Thereafter, salinity level was well below the standard of 15.5mS/cm.

Channel water salinity conditions in the Marsh were mainly driven by precipitation during December 2002. Salinity levels during the early half of December were stable at all compliance and monitoring stations due to SMSCG operation, however, the huge decline in salinity around mid-December was primarily attributed to increased precipitation. Thereafter, salinity levels continued to decline at all compliance and monitoring stations due to continued rain and runoffs. The salinity drop at S-21 and S-97 (Figures 1 and 2) appear to be steeper than other marsh stations because of local creek runoffs which contribute to those two areas.

Comparison of Reporting Period Conditions with Previous Years

Monthly mean high-tide SC at the compliance and monitoring stations for December 2002 were compared with means for those months during the previous nine years (Figure 4).

Means salinity pattern of C-2 and S-64 stations for December 2002 appears to be similar to that of 2001, but of a higher magnitude. Stations S-49, S-42, and S-21 salinity pattern appears to be similar to that of 1996 and 1997, where S-49 and S-21 are lower than

S-42. S-35 and S-97 salinity pattern appears to be similar to that of 1993, 1994, 1995, and 2000, however, of higher difference between the two stations. This higher difference could be due to local creek runoffs contributing fresher water quality of water to the northwestern side of the marsh (i.e. where S-97 and S-21 reside). Normally, S-42 and S-21 salinity levels are close, however, S-21 is noticeably lower than S42 in December 2002, and possibly due to dissimilar local creek runoff.

Table 1**Monthly Mean High Tide Specific Conductance at Suisun Marsh
Water Quality Compliance Stations****December 2002**

Station	Specific Conductance (mS/cm)*	Standard	Standard meet?
C-2**	6.1	15.5	Yes
S-64	6.0	15.5	Yes
S-49	7.3	15.5	Yes
S-42	8.6***	15.5	Yes
S-21	6.6	15.5	Yes

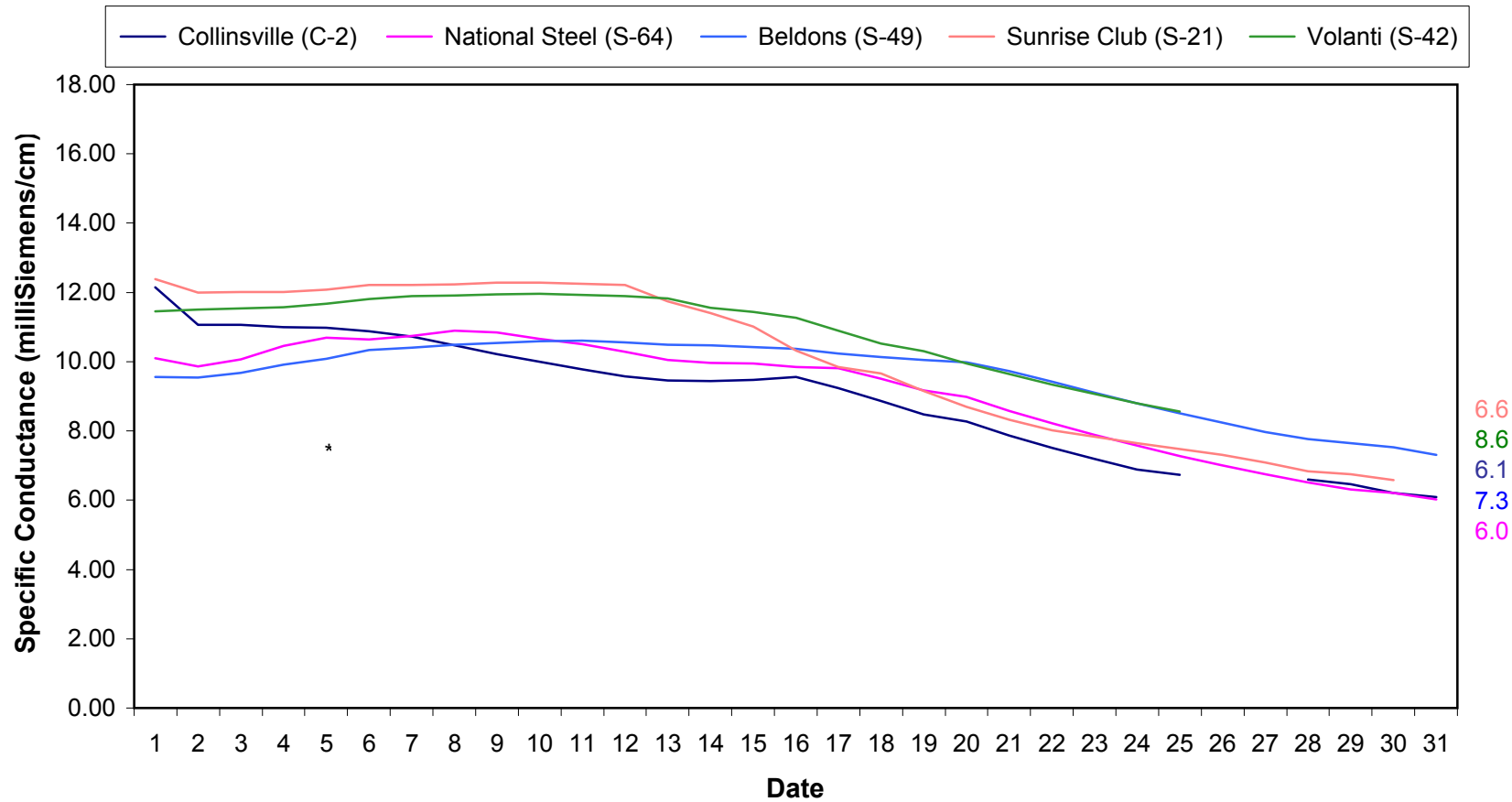
*= milliSiemens per centimeter

**The representative data from nearby USBR station is used in lieu of data from station C-2.

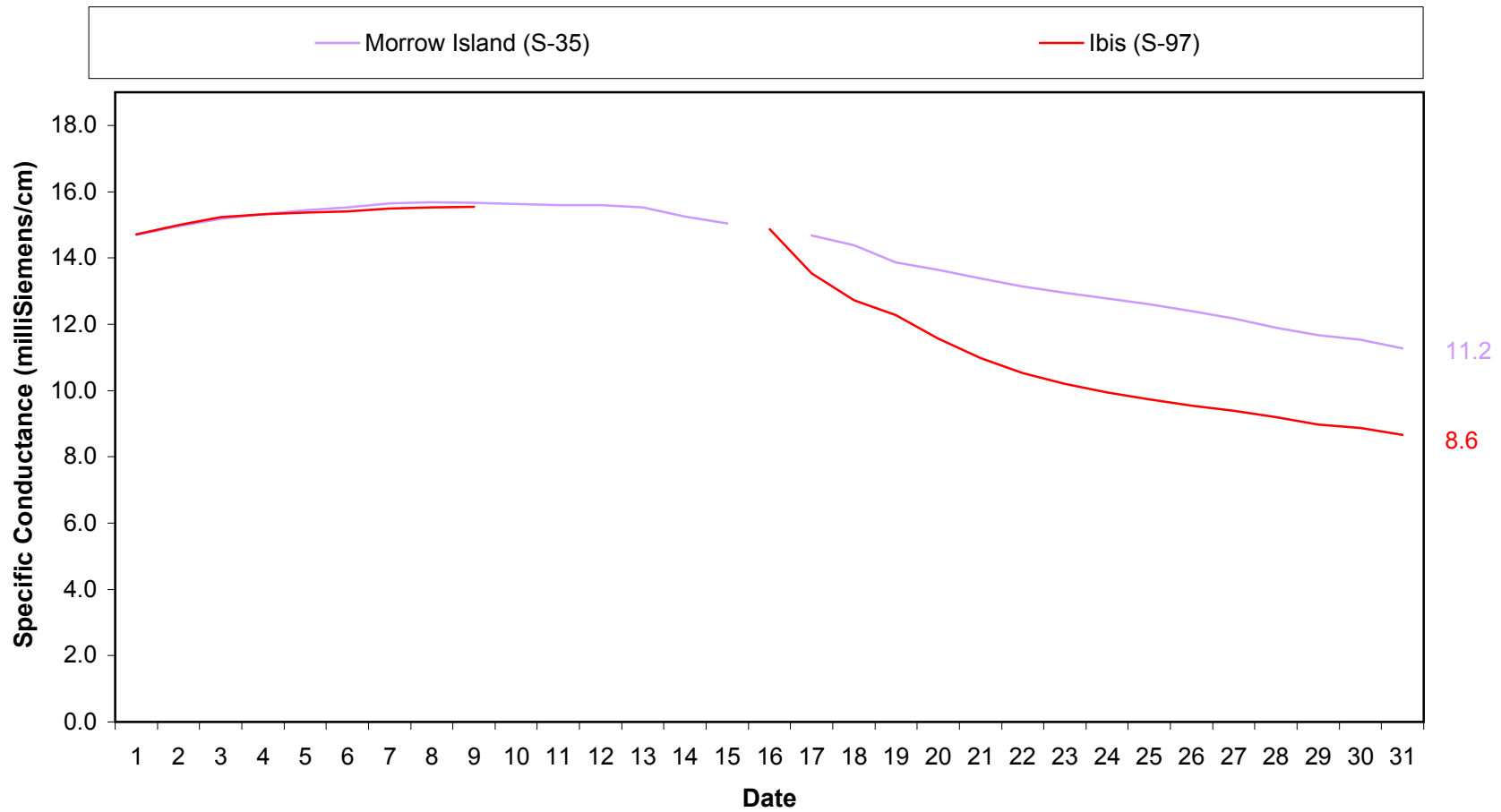
***Data does not reflect the end of month mean. Data collection was halted before the end of month due to equipment problem. The end of month SC estimate for S-42 is about 7.6mS/cm based on the fact that S-21 and S-42 are close in proximity and salinity patterns are about 1.0mS/cm differ.

**Figure 1. Suisun Marsh Progressive Mean High Tide Specific Conductance
December 2002**

Standard = 15.5 mS/cm

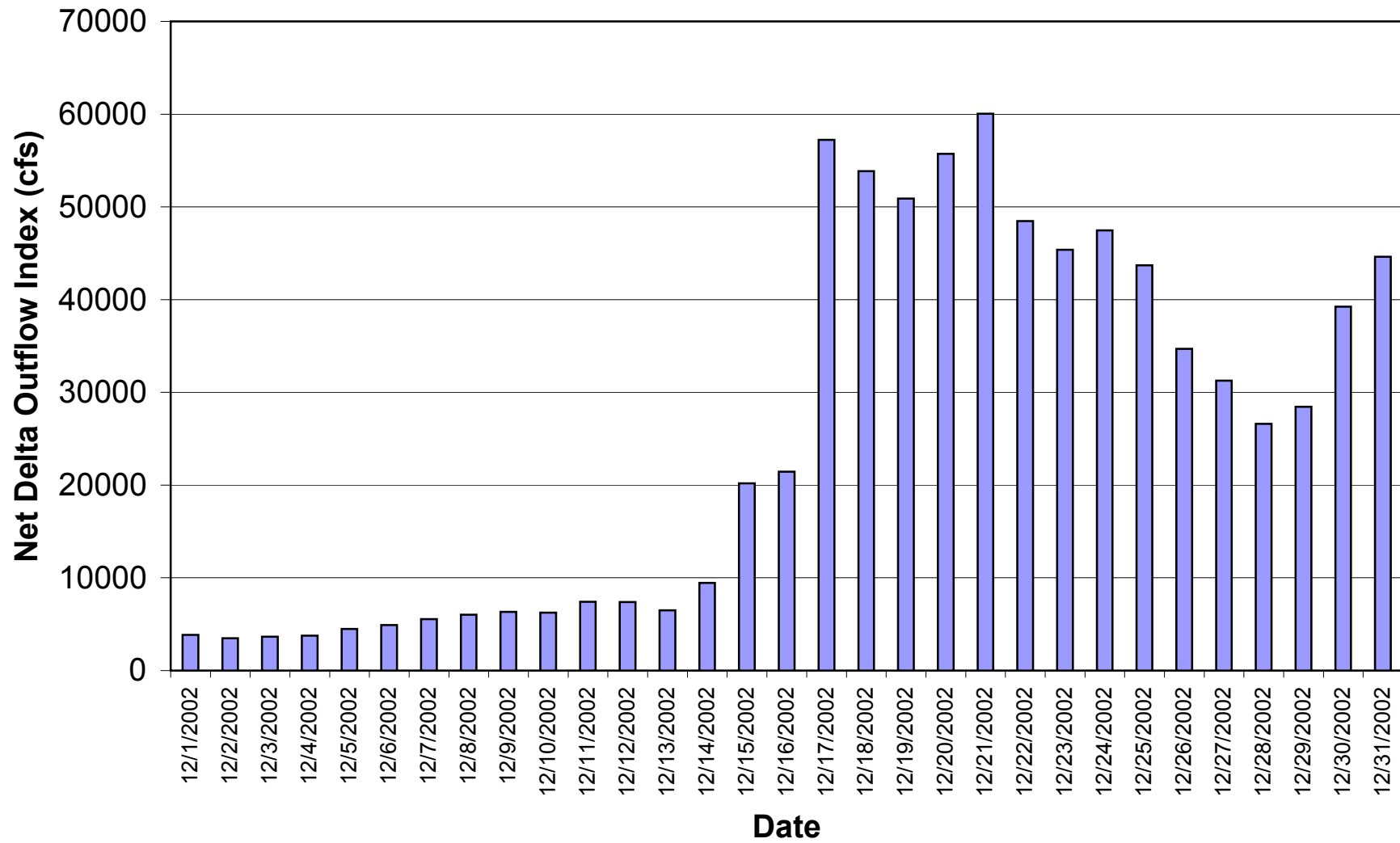


**Figure 2. Suisun Marsh Progressive Mean High Tide Specific Conductance
December 2002**



Note: S-97 data missing due to equipment problem.

**Figure 3. Daily Net Delta Outflow Index For
December 2002**



**Figure 4. Monthly Mean Specific Conductance at High Tide:
Comparison of Monthly Values for Selected Stations
December 1993-2002**

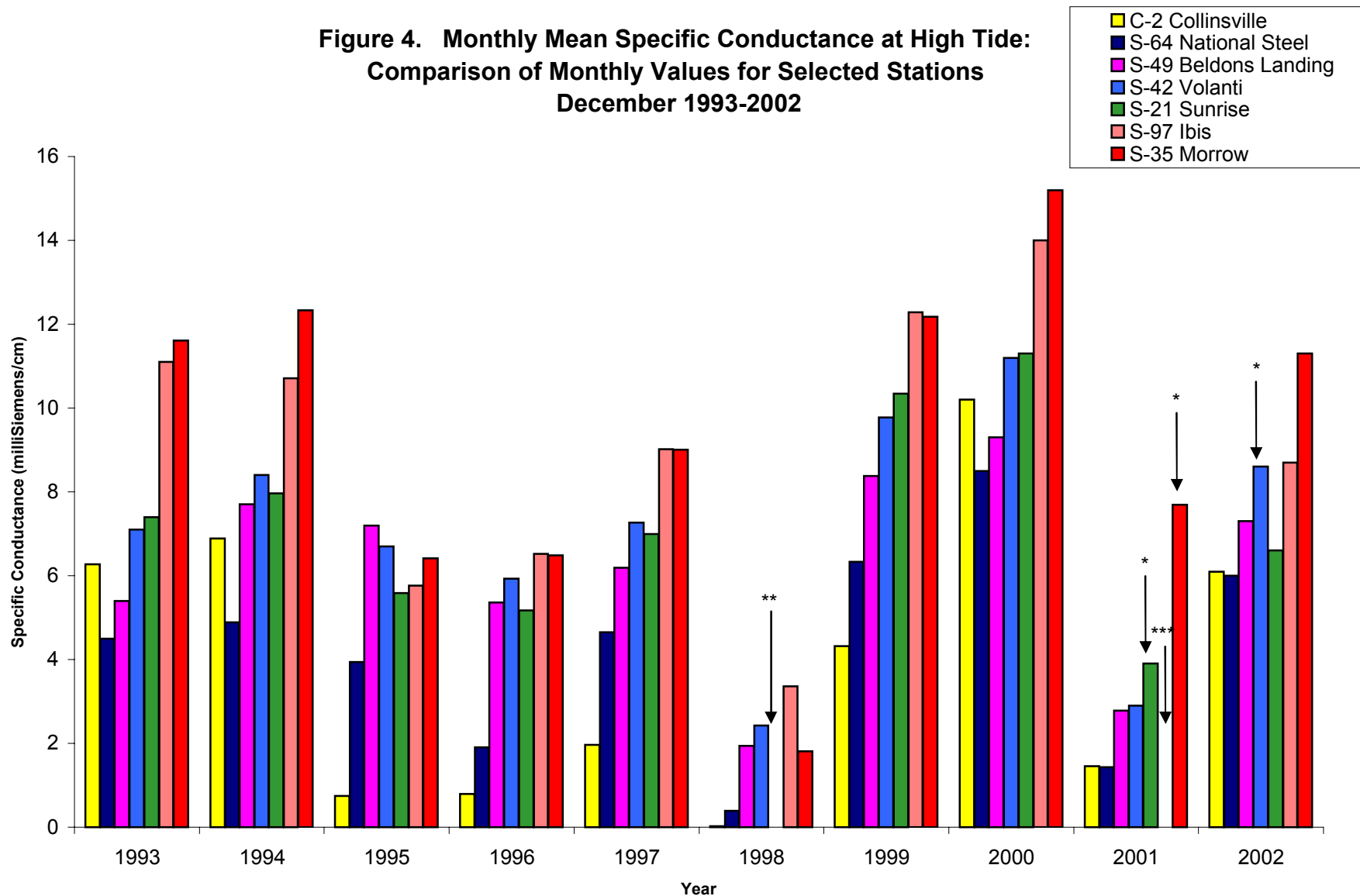


Figure 5

